A LABELLING SYSTEM FOR THE RENOVATION OF EXISTING HOUSES IN JAPAN

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Abstract

Japan experienced a significant new housing market for about half a century. Its size exceeded one million housing units every year since 1968 until 2008. Consequently the number of existing houses has reached over 60 million, exceeding that of households by about 8 million today. Therefore it can be said that the housing market in Japan is facing a considerable turning point from new-building oriented to maintenance and renovation. Corresponding to this situation, not only the housing industry but also the government have begun to change their behavior.

In 2012 the Japanese government established a new labelling system for renovated houses in order to stimulate the renovation market and make existing houses of higher quality and durability. The authors have chaired the special task force of the Ministry of Land, Infrastructure, Transport and Tourism (MLIT) to establish this new labelling system for renovated houses. The target quality of renovated houses was determined based on the result of a survey with regards to the actual conditions of existing houses and the renovation industry. In this paper, the process and the newly established labelling system for the renovation of existing houses are made clear.

Key words

Housing policy; renovation; labelling system; high quality; long life; Japan

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1 INTRODUCTION

Japan had kept annually the construction of over nine new housing units per one thousand inhabitants for about forty years since 1967. But in 2007, the number of units fell below nine housing units per one thousand inhabitants and settled at about six housing units in 2009, 2010, 2011 and 2012. The Japanese government as well as the housing industry have come to believe that while the new housing market will probably shrink, residents' demand for effective use of existing housing will increase. Nowadays Japan has over 60 million housing units which exceeds the number of households, 52 million, by about 14% (2013).

In order to stimulate the renovation market and make existing houses of higher quality and durability, the government established a new labelling system for renovated houses in 2012. The authors have chaired the special task force to establish a new labelling system. The target quality of renovated houses was determined based on the result of a survey with regards to the actual conditions of existing houses and the renovation industry. In this paper, the process and the newly established labelling system for the renovation of existing houses are made clear.

2 LITERATURE REVIEW

The importance of labelling systems for the housing quality improvement has been widely discussed and recognized [1]. Actually there are various systems such as BREEAM in UK, LEED in USA, P-mark System in Sweden, ENERGY STAR in USA, BEPAC in Canada, GBTool and CASBEE in Japan. But their focuses are on energy efficiency or environmental impact [2] and different from those of the labelling system explained in this paper. Also concerning the performance of renovated houses there can be found many researches but they focus on energy efficiency or environmental impact [3]. There is no academic paper that directly discusses a labelling system for renovated houses from the viewpoint of long-life.

However two kinds of literature strongly relate to this topic. One is about the change of the housing market in Japan focusing on renovation activities. Matsumura (2011) [4] explains the change of the housing market condition and classifies newly emerged businesses related to the renovation market as well as the second-hand market in Japan.

Another is about the related housing policies in Japan for such labelling systems. The new labelling system for renovated houses by the Ministry of Land, Infrastructure, Transport and Tourism (MLIT) is based on the "Approval Standards for Long-Life Quality Housing" by MLIT in 2008. These standards are based on "Housing Performance Indication System" in 2001 [5]. It proposed housing evaluation methods which were also academically pursued in many countries [6], [7]. At the same time the way to make those methods effectively work in the actual market is so important that there could be found some researches focusing on it after the application of the system [8], [9].

"Approval Standards for Long-Life Quality Housing" are not for renovation but for new housing. Although the standards themselves can be read only in Japanese at the website of MLIT (2008) [10], Minami (2010) [11] explains their content in English with an introduction of relative policies as well as related technical research and development in Japan. Meanwhile, the way to make the standards effectively work in the market is also important. Especially it is important to support their application by lots of local builders [12], [13]. So in the case of the new labelling system explained in this paper, such availability in the actual market was to be pursued.

3 METHODS

Here, not the method of research but the method of policy-making is mentioned, namely its process. The first symbolic action of the Japanese Government in the housing field relates to a large societal shift - from a flow-focused society or throwaway society toward a stock-focused society – in 2006. The action established the "Basic Act for Housing" in June 2006. Since then MLIT has started to focus on the development of a durable and high quality housing stock.

Their methods to extend the service life of housing had been composed of laws, tax systems and budgetary allocations. As far as the law is concerned, MLIT established a new approval system in 2008 for the construction and maintenance of new housing, namely "Approval Standards for Long-Life Quality Housing" [14]. The approval system has been for the promotion of long-life, high quality houses that are durable and easy to maintain with a tax reduction system and budgetary support for loan programs. The approval standards for long-life quality housing were based on the Housing Performance Indication System, which is used for assessing housing performance, under "Housing Quality Assurance Act" established in 1999. Over twenty percent of the new housing market in Japan applies to this system.

In the approval standards, there are four standards set as essential requirements for long-life housing and five for long-life housing as a common asset in society for future generations and use. The first four are anti-degradation measures, earthquake resistance, ease of maintenance and upgrading, and flexibility for functional durability. The latter five are basic barrier-free designs, high energy-efficiency, consideration for living environment, sufficient floor space, and submission of maintenance plans. (*Fig. 1, "Grade" represents the grading of Housing Performance Indication System*)

However the methods of MLIT were merely for new housing. Indeed it is important to make new housing of long-life quality, but it is more important to make existing houses of high quality and durability because of the almost 60 million existing houses all over Japan - whereas the market is building less than one million a year. When MLIT started to discuss the necessity of a labelling system for renovated houses in 2012, they noticed a conflict. On one hand the already established "Approval Standards for Long-Life Quality Housing" should have been respected even in the case of renovation. On the other hand, such a high standard was not demanded in the actual renovation market. To find the way to manage this conflict, they conducted interviews with thirteen companies and associations that are engaged in renovation projects as a method to indicate how to improve some of the performances described in the "Approval Standards for Long-Life Quality Housing". The interviews were done in 2012 and 2013 by a specially organized working group chaired by one of the authors, Matsumura.

After identifying some difficulties of applying the approval standards to the renovation market through the interviews and their analysis, MLIT organized a special task force to make a draft of approval standards for renovated houses in August, 2013 and the task force co-chaired by the authors made such draft in January, 2014. Based on the draft standards MLIT has established a pilot subsidy system for long-life quality renovation projects in 2014.

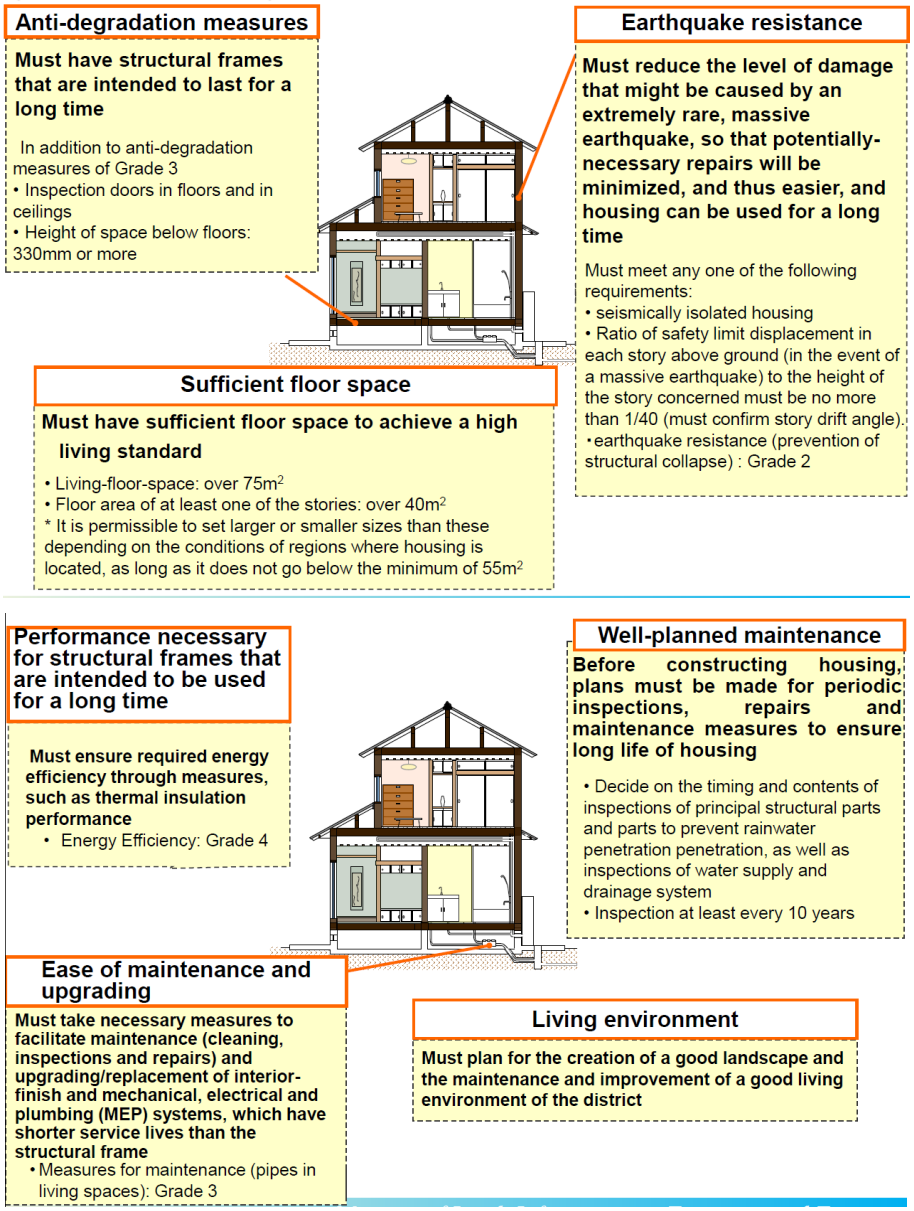

Fig. 1: Example of approval standards for long-life quality housing -wooden detached house- Source: the Ministry of Land, Infrastructure, Transport and Tourism (MLIT), Japan

4 RESULTS

4.1 Interviews

Three kinds of existing market conditions were clarified from the interviews with regards to the implementation of approval standards for renovated houses.

Firstly, partial renovation is dominant in the market. In the case of such renovation projects, improvement to some of the performances described in "Approval Standards for Long-Life Quality Housing", were conducted at a total renovation cost per a housing unit in the range, on average, of five to twenty million yen. However, most companies answered that such renovation cases could be said to be the minority in the market. So in every renovation case by those companies, the average cost is much lower and distributed from one to twelve million yen. This means that partial renovation is dominant in the actual market and that approval standards need to be able to handle partial renovation if they are expected to be

influential in the market. In addition, several companies responded that they could often find clients who repeated renovation work over several year intervals. Accordingly the promotion of long-life quality renovation should consider not only partial renovation, but a continuous type of renovation.

Secondly, the age of the original building to be renovated varies. The age in general shown in the responses by the companies is distributed from fifteen to fifty years in case of detached houses and from ten to forty years in case of flats. From the viewpoint of original specifications and expected performance, the large timespans reflect significant differences. Taking an example of earthquake resistance, the government largely changed the related building standard in 1981 (33 years ago). Concerning energy efficiency, the vast majority of newly-built houses throughout most of Japan have no insulation in the walls before the second Oil-shock in 1979. Accordingly if the targeted performance of the standards is fixed as one, the technical difficulty and the necessary cost to fulfil the requirements can differ greatly. Therefore the promotion of long-life quality renovation should take into consideration the fact that certain high requirements can discourage the renovation of many older houses.

Thirdly, the thirteen interviewees were all design-builders as renovation is mostly done by design-builders in Japan. In the case of such renovation projects, all of them inspect the conditions of the original building with regards to improving the performance quality - in an effort to reduce the uncertainty before the design-build contract. Although there is actually no demand for an independent type of inspection especially in the case of renovation work ordered by the home-owner, each design-builder does the inspection in their own way. So it is important with regards to the national approval standards to make them revise their methods to be authorized.

4.2 Introduction of Two Classes

According to the results of the interviews, the effect of the new approval standards of renovated houses will be limited if it simply follows the existing standards for new housing. Therefore careful revision of the standards were required by the special task force. Consequently two classes - Class S and A - were introduced. Class S follows the approval standards for new housing as much as possible. It simply shows what renovated houses the government expects, however it can require some high hurdles especially with respect to renovation projects of older homes or lower budget partial renovation projects. Class A eases the requirements in some parts and is expected to make the hurdles for the renovation projects lower. (*Tab. 1, "Grade" represents the grading of Housing Performance Indication System)*

As far as the very basic requirements from the viewpoint of housing policy are concerned, the set standards are the same in both classes; namely earthquake resistance, basic barrier-free designs in case of flats, sufficient floor space and consideration for living environment. With regards to earthquake resistance, two choices are added to the requirements for new housing. In the case of older homes built before the significant 1981 change in the building standard, the result of seismic diagnosis can be applied (5 in *Tab. 1*). Also as to sufficient floor space, the requirements are eased from that of new housing because the floor space of existing houses can hardly be changed.

Tab. 1: Approval Standards for Long-Life Quality Housing

Set Standards	New Housing	Renovation- Class S	Renovation- Class A
anti-degradation measures	anti-degradation measures of **Grade 3** ＋some	←**the same** but some other choices added	anti-degradation measures of **Grade 2** ＋some＋ some other choices added
earthquake resistance	1 or 2 or 3 1. seismically isolated 2. ratio of safety limit displacement in each story above ground (in the event of a massive earthquake) to the height of the story concerned must be no more than 1/100 (1/40 in case of wooden) 3. earthquake resistance (prevention of structural collapse) : Grade 2	1 or 2 or 3 or 4or 5 ←**the same**＋ 4. meet today's building regulations 5. seismic diagnosis : Is value ≧0.6, q value≧1.0 (Iw value≧1.0 in case of wooden) (Each of Is, q and Iw is seismic index of structure. [15])	←**the same**
high energy-efficiency	energy efficiency: **Grade 4**	1 or 2 1. energy efficiency: **Grade 4** 2. primary energy consumption: **Grade 4** ＋ necessary insulation corresponding to 1	1 or 2 1. energy efficiency: **Grade 3**＋double glazing 2. primary energy consumption: **Grade 4** ＋ necessary insulation corresponding to 1
ease of maintenance and upgrading	measures for maintenance (pipes in living spaces): **Grade 3**	←**the same** introducing some new choices	**Grade 2** introducing some new choices
basic barrier-free designs **(only in case of flats)**	**Grade 3**	**Grade 3** removing requirements concerning elevators	←**the same**
flexibility for functional durability **(only in case of flats)**	slab to slab≧2650mm	1 or 2 1. ←**the same** 2. ceiling height of living rooms and bed rooms≧2400mm	No
sufficient floor space	living-floor-space: over **75m²** (detached), **55m²** (flats) floor area of at least one of the stories: over **40m²**	living-floor-space: over **55m²** (detached), **40m²** (flats) floor area of at least one of the stories: over **40m²**	←**the same**
consideration for living environment	harmony with the district planning if any	←**the same**	←**the same**
submission of maintenance plans	decide on the timing and contents of inspections	←**the same**＋ decide on the timing and contents of repair if any degradation found	←**the same**

The set standards are eased in Class A compared to Class S in anti-degradation measures, high energy-efficiency, ease of maintenance and upgrading and flexibility for functional durability. In reference to anti-degradation measures, the height of space below floors cannot meet the requirements in many existing houses and cannot be changed, thus alternative measures are applied in Class A for example. Concerning high energy-efficiency, in many

cases the costs can be substantial to install new insulation layers and change the windows to meet the new requirements in Class S, thus the easing of requirements is introduced along with partial improvements – e.g. thermal reinforcement only for some main rooms is allowed in Class A. In relation to ease of maintenance and upgrading, as it is very difficult to change the piping route to meet the requirements in Class S, easing measures are introduced in Class A. Concerning flexibility for functional durability, as the change of the story height is almost impossible, no requirement is set in Class A.

The only requirement of the set standards that is more severe regarding renovated houses over new houses is the submission of maintenance plans. An inspection following the guidelines by MLIT must be done in the case of renovation.

5 CONCLUSION

The first application of the approval standards for renovation by MLIT started in February, 2014 just after the completion of the draft. MLIT selected four of the nine set standards as indispensable ones. They were anti-degradation measures, earthquake resistance, sufficient floor space and submission of maintenance plans. And two other sets were defined as those which applicants could decide whether they would apply or not. They were high energy-efficiency, and ease of maintenance and upgrading. Consequently three sets - basic barrier-free designs (only in case of flats), flexibility for functional durability (only in case of flats) and consideration for living environment – were not applied.

The number of applicants were beyond MLIT's expectation. 18,151 housing units applied and about one third, namely 6,458 housing units were selected as long-life quality renovation to be subsidized by the government. They included 2,529 detached houses, 1,130 housing units of flats for infill renovation and 98 flats (2,799 housing units) for base building renovation. The second trial call started in April, 2014 and the approval will be done in June. The results of the two trial applications are to be studied from a feasibility viewpoint with regards to the actual market this year. After some revision based on the two trials, it will be applied regularly from 2015.

As the first trail showed, there were various ways in which the approval standards were applied to the housing renovations. The possible selection of some sets as indispensable requirements and of required classes can make the direct promotion of housing policies such as subsidy and tax break flexible responding to a variety of purposes. Also in terms of indirect promotion, the government can encourage the second-hand and renovation market to apply the approval standards as a reliable labelling system based on third party evaluation.

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